

Patent Abstracts of Japan

PUBLICATION NUMBER : 62124511
PUBLICATION DATE : 05-06-87

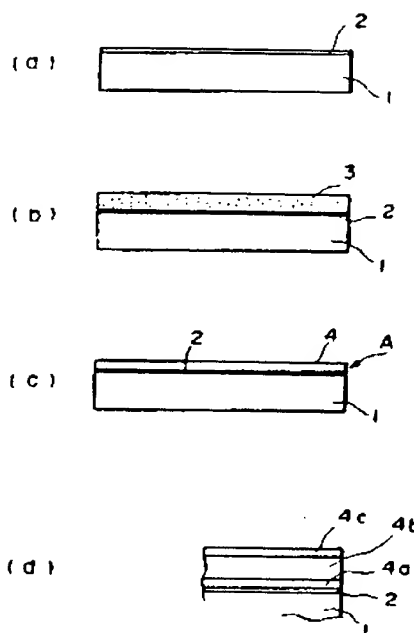
APPLICATION DATE : 25-11-85
APPLICATION NUMBER : 60264625

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INT.CL. : G02B 6/12 C30B 33/00 H01L 27/14

TITLE : PREPARATION OF SILICON WAFER
HAVING OPTICAL WAVEGUIDE FILM



ABSTRACT : PURPOSE: To enable formation of an electronic element on a substrate on which an optical circuit element has been formed without being restricted in relation to the process by retarding diffusion of dopant to the silicon substrate side by providing a diffusion inhibiting layer.

CONSTITUTION: An inhibiting layer 2 for diffusion of dopant comprising SiO_2 film is formed by oxidizing thermally the surface of a silicon wafer 1. The silicon wafer is a P type CZ wafer having (100) face bearings and $9\Omega\text{-cm}$ resistivity. The thermal oxidation is carried out in dry CO_2 atmosphere at $1,000^\circ\text{C}$ and the thickness of the SiO_2 film is regulated to ca $1,000\text{\AA}$. Succeedingly, gaseous starting material for forming glass consisting primarily of SiCl_4 contg. appropriate amt. of GeCl_4 , BCl_3 , PCl_3 as dopant is converted to fine glass particles by the frame hydrolysis of the gaseous starting material to deposit film 3 of fine glass particles having ca. $700\mu\text{m}$ thickness, which is heated in an electric furnace (in oxidizing atmosphere) to $1,150^\circ\text{C}$ and held for 2hr to vitrify the fine glass particle film 3 to transparent glass. Thus, optical waveguide film 4 is obtd. on the silicon wafer 1.

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